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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,907	12/26/2001	Yun-Ho Jung	8733.565.00	7489
30827 7590 05/18/2007 MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006			EXAMINER PADGETT, MARIANNE L	
			ART UNIT 1762	PAPER NUMBER
			MAIL DATE 05/18/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/025,907	<b>Applicant(s)</b> JUNG, YUN-HO	
	<b>Examiner</b> Marianne L. Padgett	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/10/2007 & 2/9/2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/10/2007 has been entered.

The examiner notes that this action is based on amendments made with this RCE request of 4/10/2007 & amendments made with the after final of 2/9/2007. It is noted that the after final amendment removed the last three lines of both independent claims, removing previously rejected new matter, thus aside from the addition of "to a fixed position" or "to a set position", the claims are substantially identical to those presented in the amendment of 8/23/2005 & rejected in the action of 10/5/2005.

2. The disclosure is objected to because of the following informalities: in [0020] the objectives of the process are inappropriately defined by the claims (page 7, line 16), which do not remain as originally filed, i.e. every change in the claims changes the objectives. It is also noted that in [0021], on line 20 of page 7, appropriate spacing after punctuation is missing. In [0022] on page 8, the phrase "...is movable rather long way..." is non-idiomatic, and in [0023] & [0024] on lines 13 & 19 of page 8 the phrase "whenever the mask moves by the mask stage" appears to use the wrong verb tense, as it literally moves the mask in relation to the mask stage, instead of moving the mask using the stage (changing "moves" to --moved-- would be adequate, although rephrasing might be better).

Appropriate correction is required.

3. With respect to the contents of claims, it is noted that in claim 5, in the steps concerning "repeatedly melting and crystallizing...", that this is claimed to occur "**whenever** the mask steps in the first direction by the mask stage until a lateral grain growth stops..." or "**whenever** the X-Y stage steps" (emphasis added), which as phrased may mean that the laser irradiation is occurring during movement of the mask or stage, i.e. during the stepping operation. It is noted that this is consistent with disclosure in

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[0023 & 24], which also use the "whenever..." phrasing. Also note that the phrasing "each first portion of the block **corresponds** to each slit of the mask" (emphasis added), as found in the limitation for "melting first portions..." on lines 11-12 of claim 5, does not specify **how** each first portion **corresponds** to each slit, just that there is some undefined relationship, i.e. the claims include any specific configurational relationship, unlike specification disclosures, such as on page 10 lines 7-8, which provide teaching such as "the width of each slit 'A' defines a size of the silicon grain crystallized...".

The examiner reviewed the specification looking for teachings or terminology which would correspond to the "a fixed position within the block" or "a set position within the block" as used in the claims for amendments of 2/9/2007 & 4/10/2007, respectively, however such nomenclature or phrasing was not found. On the other hand, the description of figures 5A-F described in paragraphs [0037-42], suggested to the examiner that perhaps applicant's claims are not saying what they intend, or that there is a translation misunderstanding. While these paragraphs of the specification do not state explicitly that the mask is not moving during the irradiation, unlike the claims or earlier cited disclosures, neither do they for the most part explicitly require movement during irradiation, and they do discussed time periods when irradiation is stopped, such as page 11, lines 20-25 or page 12, lines 17-19. Figure 5C & D appear to indicate movement of mask simultaneously with irradiation (see arrows in figures), while figures 5A & B, plus 5E & F only show irradiation, not movement, with paragraph [0039] indicating that the mask stage is moved **after** the first irradiation, without mentioning irradiation during the movement, but the phrasing in the last sentence of [0040] "the mask 138 moves for the second laser beam irradiation", does appear to require movement during the irradiation, although it is possible that the phrasing is ambiguous and could have been possibly intended (not necessitated) to mean that the mask was moved for the purpose of positioning for the second laser beam irradiation, but this is only the examiner's guess, based on applicant's arguments in the third paragraph of the remarks (page 6 of the 4/10/2007 response) & the

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amendments concerning "a set position", and cannot be considered to provide necessary support for such meaning.

4. Claims 5-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants have amended the first "stepping..." limitation of each independent claim such that it now reads "stepping the mask in the first direction by several micrometers **to a set position** within the block using the mask stage" (emphasis added), which as phrased literally means that the mask must be moved in a direction inside the block, which is an area of amorphous silicon (in claim 5, block is defined on line 10), thus is physically impossible. Note that previously, the mask's stepping was defined by direction & distance of the direction only, which could be described as being "within", as the direction of movement is a relative physical relationship not a physical object, but the addition of "to a set position" to the claim language does not work very well due to the subtle difference in meanings & how the different parts of speech relate to each other. The examiner suspects the applicant's intent would've been more in line with a meaning such as --stepping the mask in the first direction by several micrometers to a position above [or over] the block using the mask stage--, however this guess is not what was actually claimed.

It is unclear as read in light of the specification, what is meant by "a set position" to be achieved by the procedure of "stepping the mask", due to the above problem & especially as nothing is actually done at that "set position", and the location of the mask is being repeatedly changed, with irradiation claimed to be occurring "**whenever** the mask steps" as phrased in claim 5. The phrasing in claim 11 is more general, such that it's not necessitated **when** laser application occurs with respect to stepping procedures, especially since one must remember that order of listing limitations/steps does not necessitate any order of doing those steps, unless there are temporal or antecedent requirements in the claims. For instance in claim 11, the scope of the claim is inclusive of applying the laser beam at the same time as

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stepping the mask, as nothing in the mask stepping limitation requires the "applying..." to already have occurred, nor prevents it from occurring during the "stepping the mask...", especially as this is entirely consistent with the requirement of the specification in paragraphs [0023-24] in the summary that irradiation or melting occurs **whenever** the mask is moved. What moving or stepping the masks to a "set position" is supposed to accomplish is unclear in the context of either the claim or the specification, although the examiner supposes that given the teaching in the specification of irradiation or melting during stepping movement, that the "set position" could be where one waits for the melted portions to finish crystallizing before commencing the next laser melting & movement repetition, but this is necessitated by neither the specification nor the claims, nor is it excluded. Considering applicant's discussion in their remarks, the examiner doubts that such was the intent of the claims, however the examiner must deal with the language that is in the claims & the specification, not procedures discussed in the remarks that are not commensurate in scope with the claim language or the specification.

One might also consider the amended phrasing unclear or ambiguous, in that it is uncertain what the modifier "set" is intended to add to --stepping the mask... to a position--, since due to the "repeatedly..." limitation it is clearly not a permanent position (one possible meaning of "set"), but if it is intended to mean something approximating -- predetermined --, such is not necessarily indicated by the specification. Basically, the modifier adds no clear differentiating meaning to the claim, hence it is unclear to the examiner what meanings it might necessitate that are different than already required by the limitation of "in the first direction by several micrometers", which already told how one gets to the -- a position--, or as amended to "a set position".

5. Claims 5-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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See section 4 above, and note that paragraphs [0038-39], which were cited as support by applicant (last sentence of the third paragraph in their remarks of 4/10/2007), were discussed above. The examiner has no quarrel with applicant's characterization of "Stepping implies moving a particular distance then stopping", as stepping can clearly be considered **inclusive** thereof, **but** stepping **also** encompasses incremental movement with distinct shifts in that movement that may include changes in direction at specific positions, that may or may not encompass stopping at that position, so the use of "stepping" does not necessitate stopping. However, as the term "set" can have numerous possible meanings, i.e. fix, place, put, stick, permanent, predetermined, designated, etc.; the terminology was not used in the specification, so cannot be read in light thereof; & possibly adds no actual meaning to the claims, as indicated by applicant's discussion that seems to say their intent is only to emphasize what they think they already said; this amendment appears to either add no new meaning to the claim, or potentially add New Matter.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over IM (6,368,945), discussed in sections 11, 6, 6, 2 & 3 of the actions mailed 11/14/03, 4/12/04, 10/21/04, 5/23/05 & 10/5/2005, respectively.

Note that the patent to Im (6,368,945), incorporates-by-reference of both SN 09/390,537, now PN. 6,573,531 (col.3, lines 58-67); and SN09/390,535, now P.N. 6,555,449 (col.4, line 50-col.5, line 2<sup>+</sup>), hence the (954) patent encompass the disclosures of all 3 references.

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In Im, see the abstract for laser treating  $\alpha$ -Si films with beamlets; Fig. 1A described on col.4, lines 1-17<sup>+</sup>, noting positioning of laser/lens 148/masking system 150/lens 162/substrate 170/translation stage 180 are as claimed. Flow chart of Fig.8, described on col. 10, line 27-col. 11, line 27 encompasses the sequence of applicants' claims in that the continuous incremental melting/crystallization using "beamlets" to complete "columns" (ref#1050), corresponds to the claimed portions forming blocks, with completing subsequent "columns" by repeating techniques after repositioning corresponds to "another block." Im illustrates sample masks in Fig. 2A – 4A & 6A, with the resultant SLS crystallization patterns (B) illustrated beside them, discussed col. 4, line 65-col.5, line 15, and where the pattern of slits in the mask illustrated in figure 4A (col. 5, lines 6-15+) is particular relevant to applicants' disclosure/claims. While the flow chart states that the sample is translated for the various motions (#1040,1045,1055 and 1066), col. 4, lines 14-17, 39-57<sup>+</sup> & 54-57 indicate that sample translation with respect to the laser may be by moving **either** the masking system 150 **or** the sample stage 180, hence translations corresponding to ref# 1055 of the flow chart, are clearly suggested to be preformed via moving the mask, or translations ref #1066 corresponding to repositioning for the next column/block includes suggested movement/stepping by XY table. Figures 1B or 7 illustrate patterns for crystallization of successive columns/blocks described on col. 4, line 39-col. 7, line 67<sup>+</sup>, etc., specifically noting col. 4, line 44 specifies that translations may be via masking system 150, where the above lines 14-17 note that either X or Y direction microtranslations may be accomplished via movement of a mask within the masking system. Note that the continuous translations into Y direction represented by lines labeled with ref.#30 or 55 (col. 6, lines 1-25) are neither necessitated nor excluded by applicant's claim language, but these translations (whether by mask or stage movement) bring the laser to positions shown by ref. # 40 or 65, at which time a microtransition for a predetermined distance (e.g., 3  $\mu$ m) in the X-direction is made as shown by path #45 (col. 6, lines 26-35), which may be made by stepping movement of the mask, that can be described as being over or above the column/block being treated, which is the probable meaning intended to be encompassed by applicant's



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claim language (actual language requires an impossible act if one does not wish to destroy one substrate). Beam path 70 has described on col. 7, lines 5-15+, as a stepping action of 2 cm to the next column, where lines 20-25 indicate that the radiation of an entire column/block has been completed and that the sample 170 is stepped to the next column which reads on applicants claim of stepping the XY stage block by block, i.e. in order to get to the next block. Col. 7, lines 56-68+ indicate that different dimensions and/or shapes for the cross-sectional area & different conceptual subdivisions of the amorphous silicon into columns, i.e. blocks may be employed in order to produce large grain, grain boundary controlled silicon than films. It is noted that col. 4, lines 13-16 and col. 11, lines 20-27, esp. line 23, refer to microtranslations (in the X & Y-directions), with col. 11 noting the possibility of reversing the translation & micro translation X & Y-directions and col. 5, lines 20-37 discusses division of a sample in to columns, then subdividing those, where irradiated portions may be made to overlap, by for example 1  $\mu\text{m}$  to avoid the possibility of having unirradiated areas.

Note that IM (945) can be considered different in that it never moves/steps the mask within the amorphous silicon film (i.e. within the block) as now claimed, since it is clearly impossible to do so without destruction of the film, but employing a process which corresponds to the probable intent of the unclear claim language, such that the mask is moved to a position(s), which corresponds to a position corresponding to relative locations that may be designated as blocks, that is somewhere above the surface of the silicon film being crystallized, i.e. the mask is located between the silicon film & laser, and thus is moved in the several micrometer stepping actions to positions that correspond to locations elevated above the silicon surface, or which are between the surface & laser. As seen above IM (945)'s process when microtransition has such a configuration, were taught possible means of micro translation include the claimed stepping of the mask such that it corresponds to the like direction in relationship to the sequential lateral solidification. As IM's specification clearly teaches the option of X-direction micro translation is via movement of the mask assembly, such a limitation may be considered completely covered.

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Alternately as the explicit example on col. 6, lines 29-31 exemplifies the process by micro translation of sample 170, it would also have been obvious to one of ordinary skill in the art that they alternatively taught means of micro translation via the mask would also have been expected to be effectively employed as suggested by the broader teachings. Note that IM's exemplary 3  $\mu\text{m}$  is considered to be in compassed by the claimed "several micrometers".

Applicant's have previously argued for the differentiation of their claims from Im, as they alleged "while Im may teach moving either the masking system 150 or the sample stage 180, it does not teach a method where both are moved as part of the crystallization process" (p. 7, bottom of 1/20/04 response). Applicant's conclusions about Im were not agreed with. For example, IM 's Fig 8 explicitly shows movement of both mask and stage in initial steps 1010 and 1015, with steps 1040, 1045, 1655 and 1066 also referring to translation of sample stage movement. Note movement of mask to "initial position" implies later movement is intended. This is further supported by previously cited col. 4, lines 38-49 that teach "the continuous motion SLS which may utilizes the system described above. In particular, the computer 100 controls the motion (in planar X-Y direction) of the sample translation stage 180 and/or the movement of the masking system 150" (emphasis added), which provide explicit teachings that both movement techniques can be employed in the same crystallization procedure, which refuted applicant's allegation.

Note while the lenses in the illustrated optics of Fig. 1A, are not discussed in detail, their shapes are suggestive of their function, which would appear to be condensing, same as claimed.

As has been previously extensively discusses & is illustrated in IM's fig. 1B, the microtranslations taught therein may be an exemplary 3  $\mu\text{m}$  in the X-direction, & are equivalent to the claimed stepping of several micrometers, in a 1<sup>st</sup> direction, have their crystal growth illustrated in figure 5(A-C), which clearly shows the growth occurring or extending in the X-direction, i.e. the same direction as the microtranslations, thus corresponding to the claim language. In the paragraph bridging p.8-9 in the

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remarks of 8/23/05 applicant said IM's crystal grains would not grow in the direction they are stepped, but this is apparently exactly opposite to what is illustrated with respect to the micro translations, since the above cited figures show multiple crystals, which limit each others' growth extending and growing laterally in the X-direction equivalent to the 1<sup>st</sup> direction in the claims. It is possible applicant's previous arguments were discussing the Y-direction translations, which are not germane to the microtranslations.

Applicant's discussion on p.8 of their remarks of 8/23/05 that appeared to be arguing that IM must teach how to move a mask for one of ordinary skill in the art to be able to employ IM's teaching of moving the mask, was NOT convincing, as any competent practitioner would have been expected to be able to substitute relative movement of mask or stage to effect the same translation, given IM's teaching to move either mask or stage, or a mixture of the two in order to effect taught SLS. IM has already supplied the motivation; it is not necessary for them to provide an example of every taught option.

8. Applicant's arguments filed 4/10/2007 & discussed above have been fully considered but they are not persuasive.

Other art of interest to the state-of-the-art include Ryu et al. (7,135,388 B2) & Yang (7,015,132 B2), which are not prior art but are directed to SLS processes of interest; and Jung (7,192,627 B2) by the present inventor, but which claims while inclusive of SLS crystallization processing are less specific with respect to the SLS process and directed to a device fabrication involving pixels.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

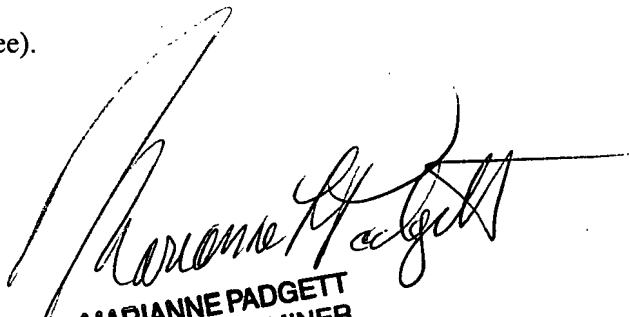
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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5/15-16/2007



MARIANNE PADGETT  
PRIMARY EXAMINER